ABSTRACT

The present methods and apparatus concern nucleic acid sequencing by incorporation of nucleotides into nucleic acid strands. The incorporation of nucleotides is detected by changes in the mass and/or surface stress of the structure. In some embodiments of the invention, the structure comprises one or more nanoscale or microscale cantilevers. In certain embodiments of the invention, each different type of nucleotide is distinguishably labeled with a bulky group and each incorporated nucleotide is identified by the changes in mass and/or surface stress of the structure upon incorporation of the nucleotide. In alternative embodiments of the invention only one type of nucleotide is exposed at a time to the nucleic acids. Changes in the properties of the structure may be detected by a variety of methods, such as piezoelectric detection, shifts in resonant frequency of the structure, and/or position sensitive photodetection.